



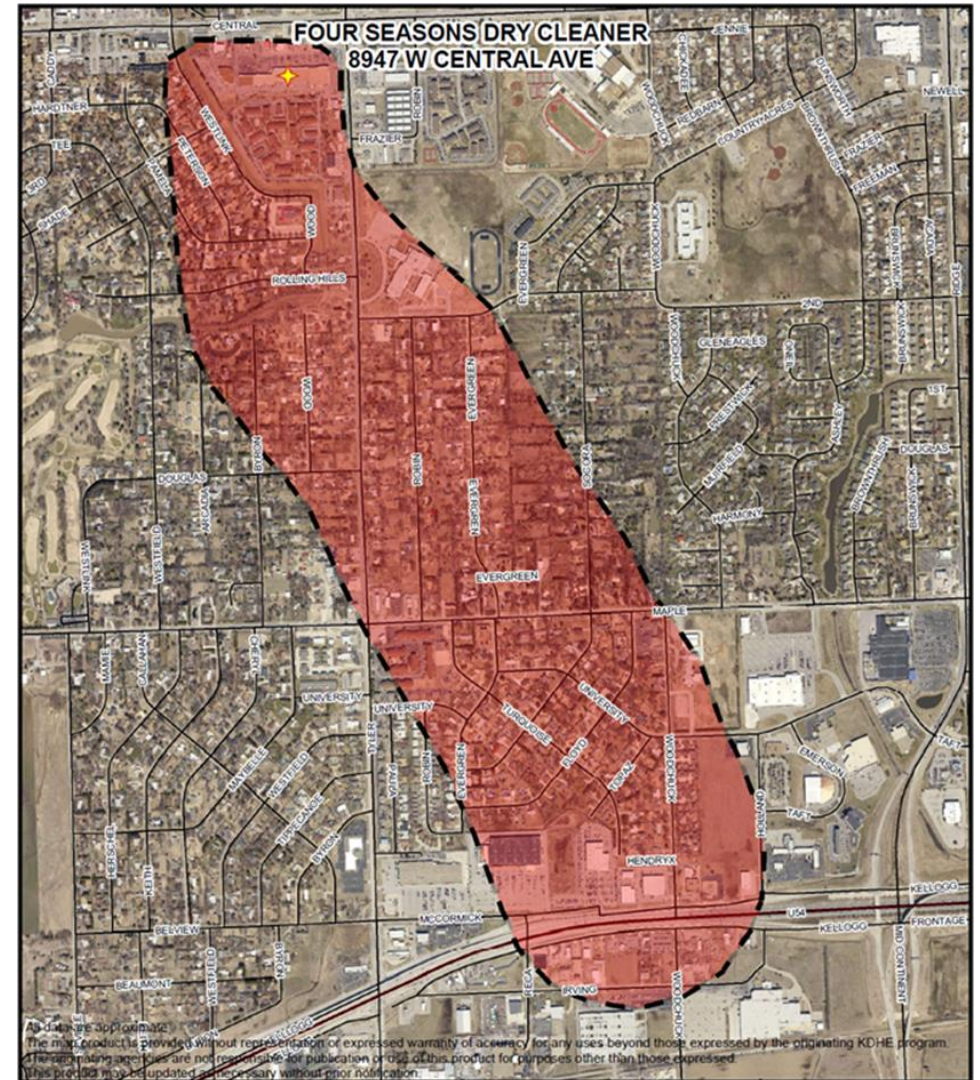
KDHE Division of Environment

Former Four Seasons Dry Cleaners

October 18, 2018

General Site Overview

- Central & Tyler in west Wichita
- Discovered during Standard Products investigation
- Identified Four Seasons & Best Cleaners as sources → Referred to Dry Cleaning Program
- Emergency Response to provide alternate water supply to impacted residences
 - Bottled Water
 - Extension of water mains
 - Connection to City of Wichita PWS



Emergency Response Summary

- Domestic and L&G well samples – 222 (\$15,000)
- Bottled Water – 69 residences (\$8,000)
- Point-of-Entry (Whole-House) Carbon Systems
 - – 17 residences (\$79,000)
- City Water Connections (\$1.7M)
 - 200 completed
 - Avg. \$2,586 plumber/property
 - Avg. \$3,379 plumber w/oversight
 - Incl. coordination/oversight/reporting
- Response total: \$2.5 M



Photo Source: KDHE

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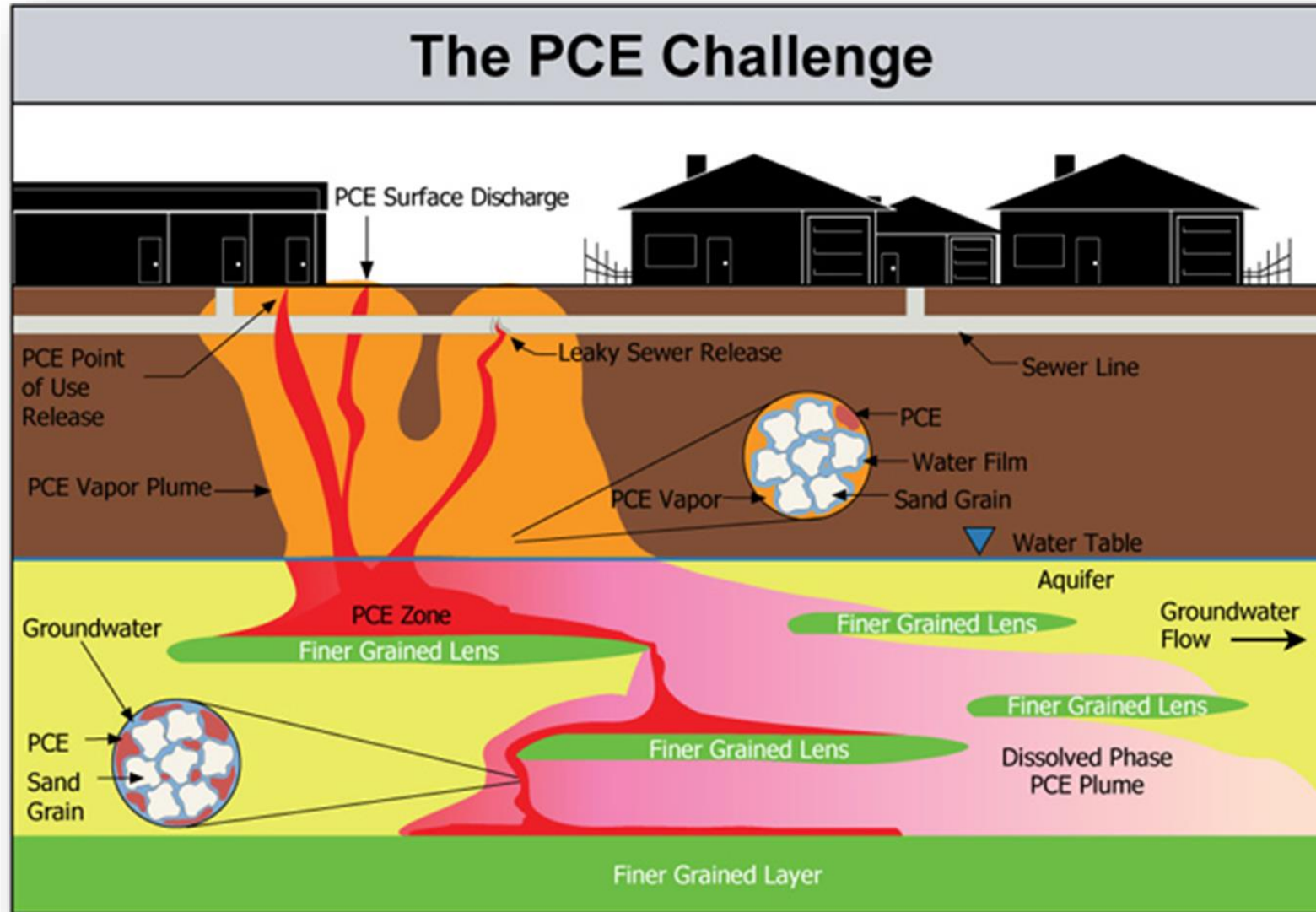


Photo Source: Washoe County

Additional Assessment and Investigation Activities

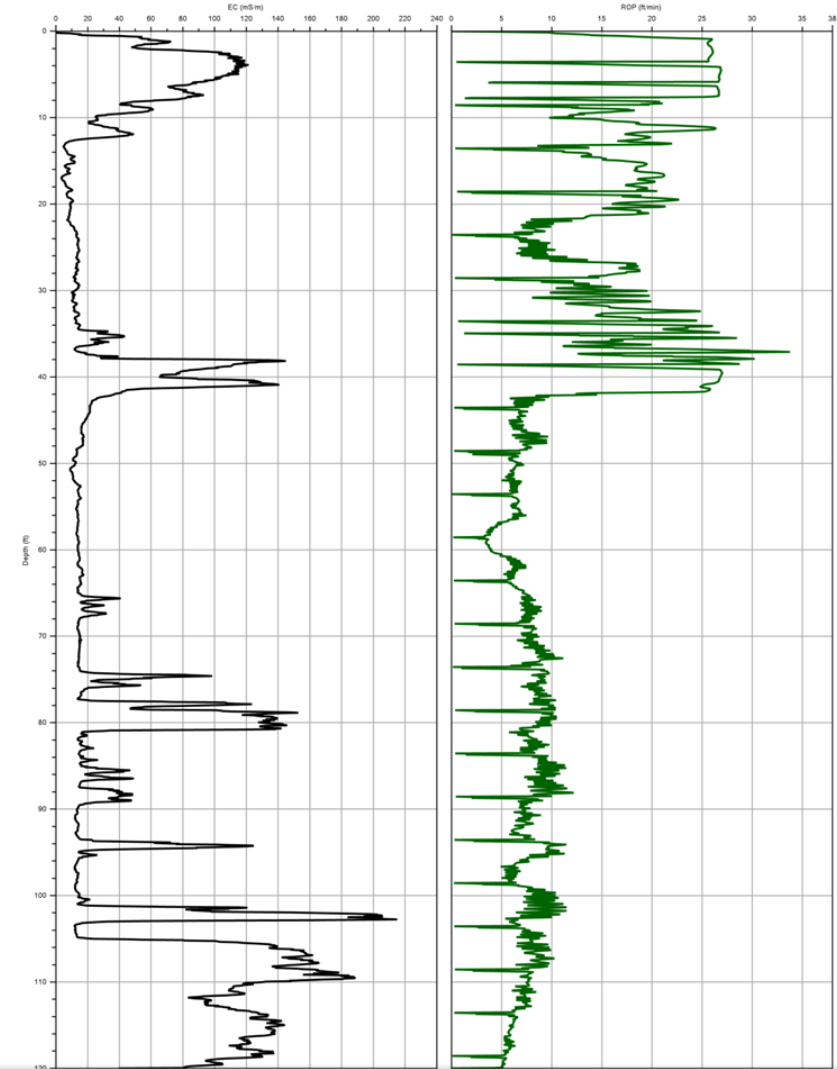


- Direct Push Electrical Conductivity Logging
- Monitoring Well Installation
 - 26 monitoring wells
 - 1; 2- & 3-well nested sets
- Source Characterization
- VI Screening 2014-2015, 2018

Photo Source: KDHE

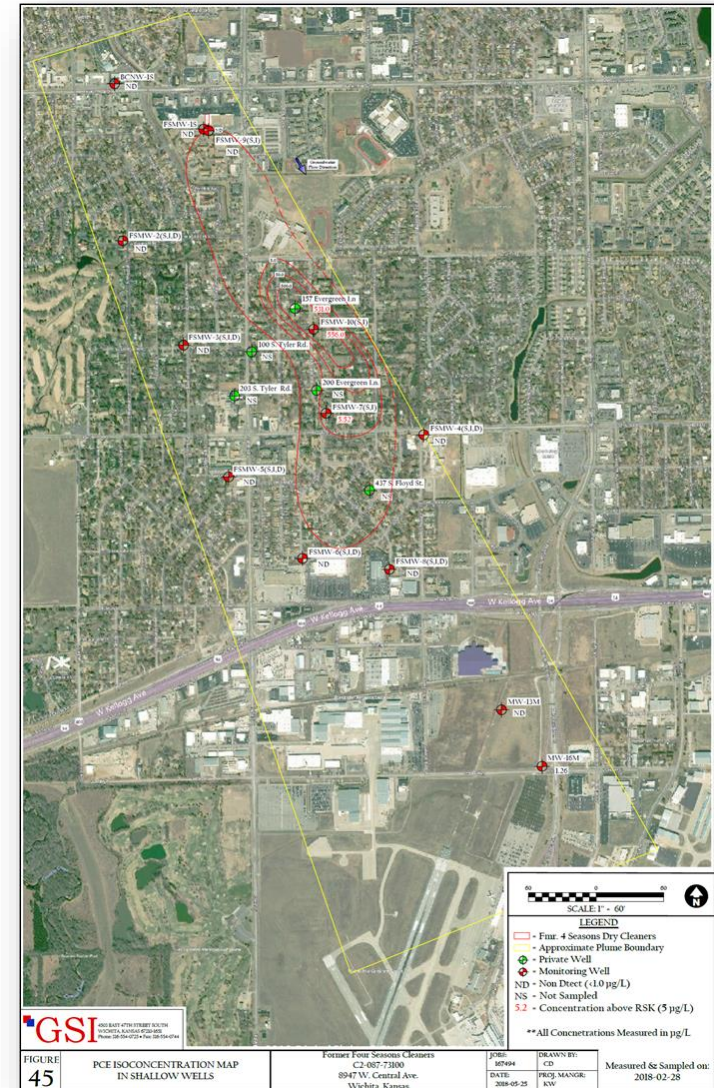
Electrical Conductivity Logging

- Measures electrical conductivity of soils
- Finer grained soils are more conductive
← Gravel ↔ Sand ↔ Silt ↔ Clay →
- Surficial silt/clay underlain by coarse sand and gravel with silt/slay stingers



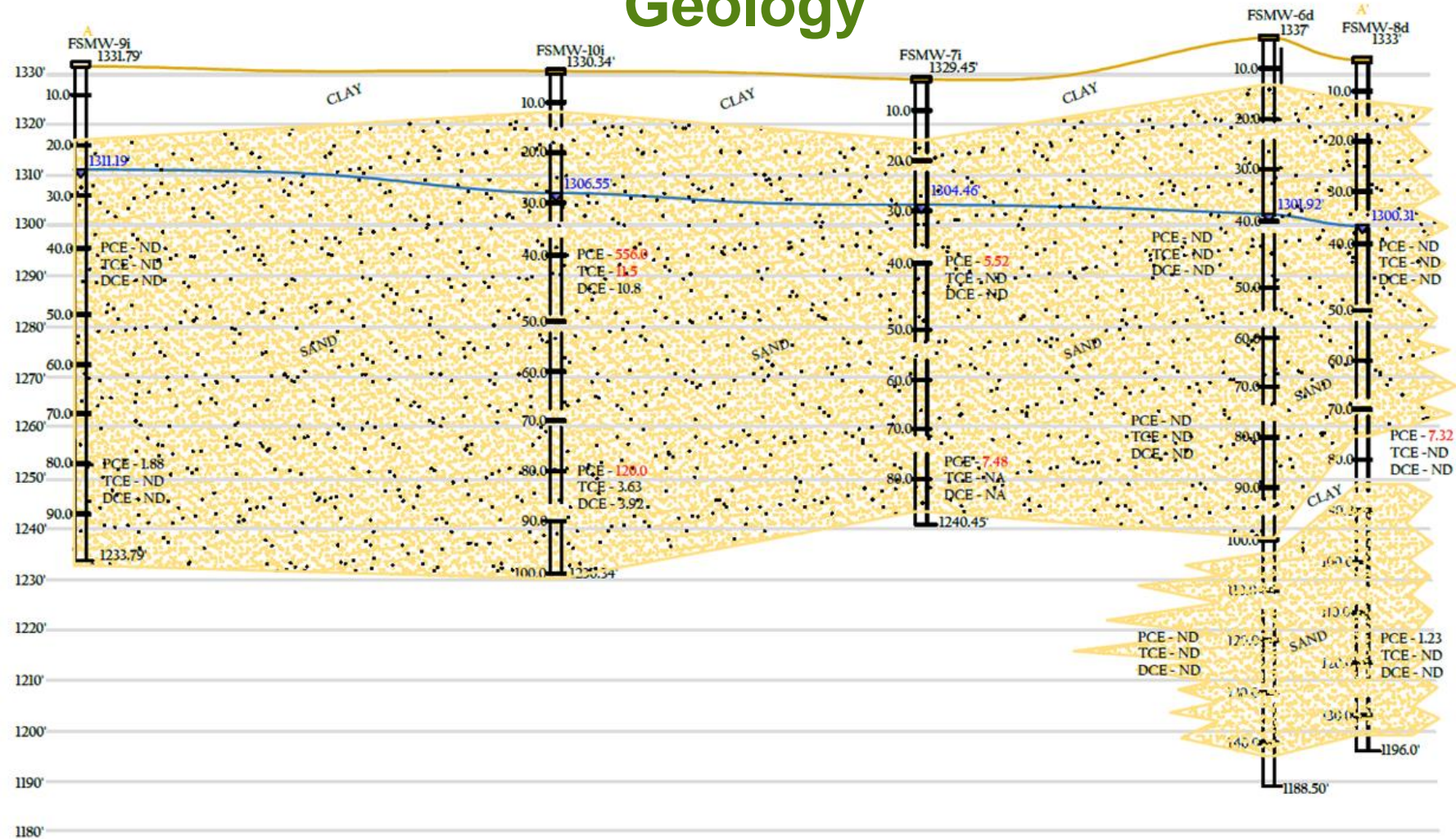
Monitoring Wells

- Sentry and Performance wells
- Targeted zones from EC logs
- Similar depths as domestic wells
 - Shallow – 65' bgs, 20' screen
 - Intermediate – 115' bgs, 30' screen
 - Deep – 165' bgs, 30' screen



Division of Environment

Geology



Source Investigation and Characterization

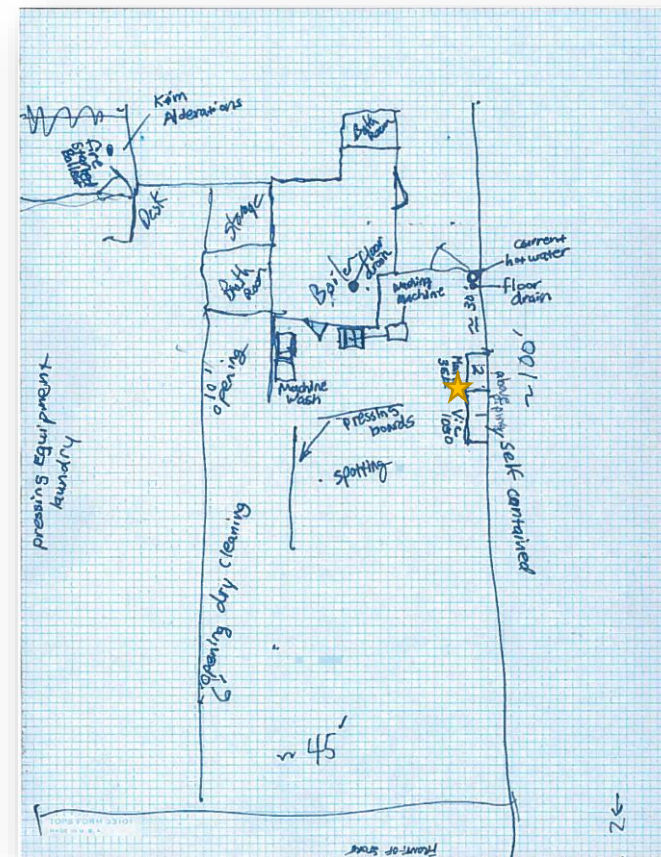
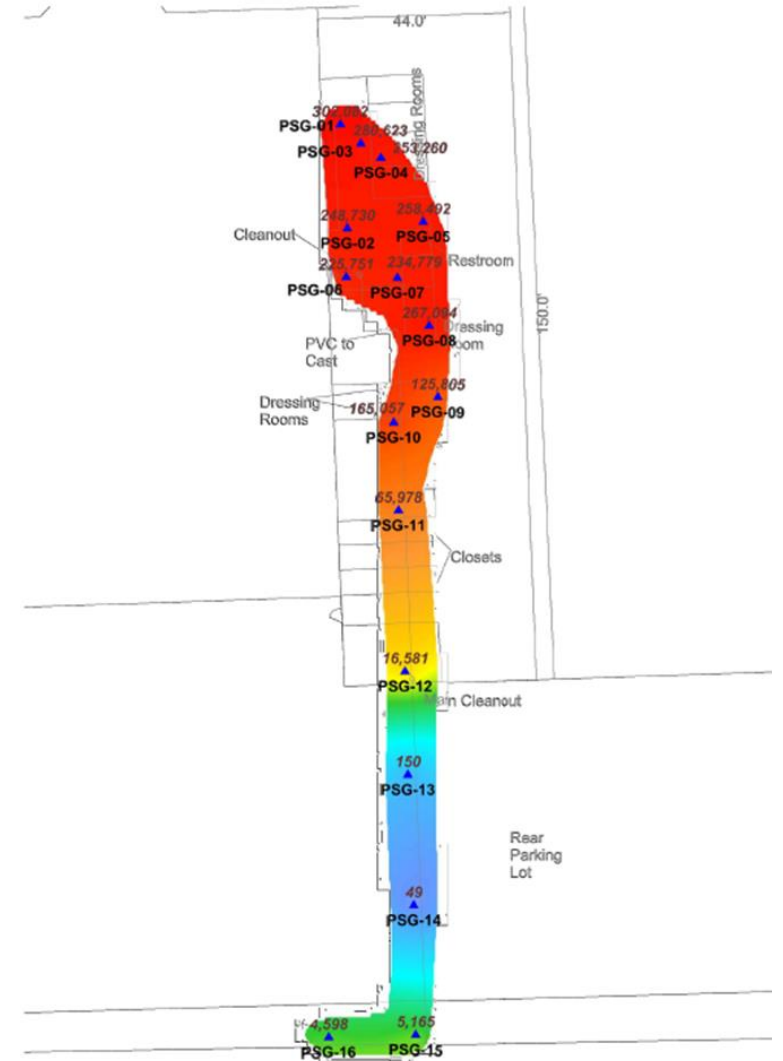


Photo Source: KDHE

Source Investigation – passive soil gas



Photo Source: Beacon Environmental



Source Characterization – soil sampling

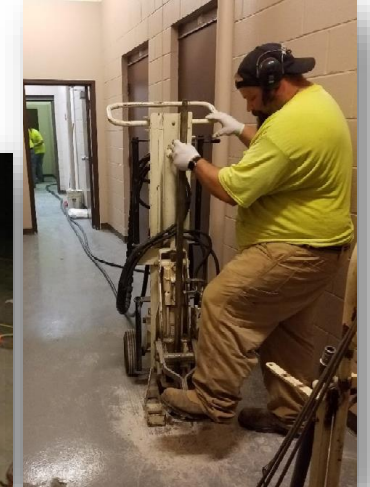


Photo Source: GSI

Vapor Intrusion

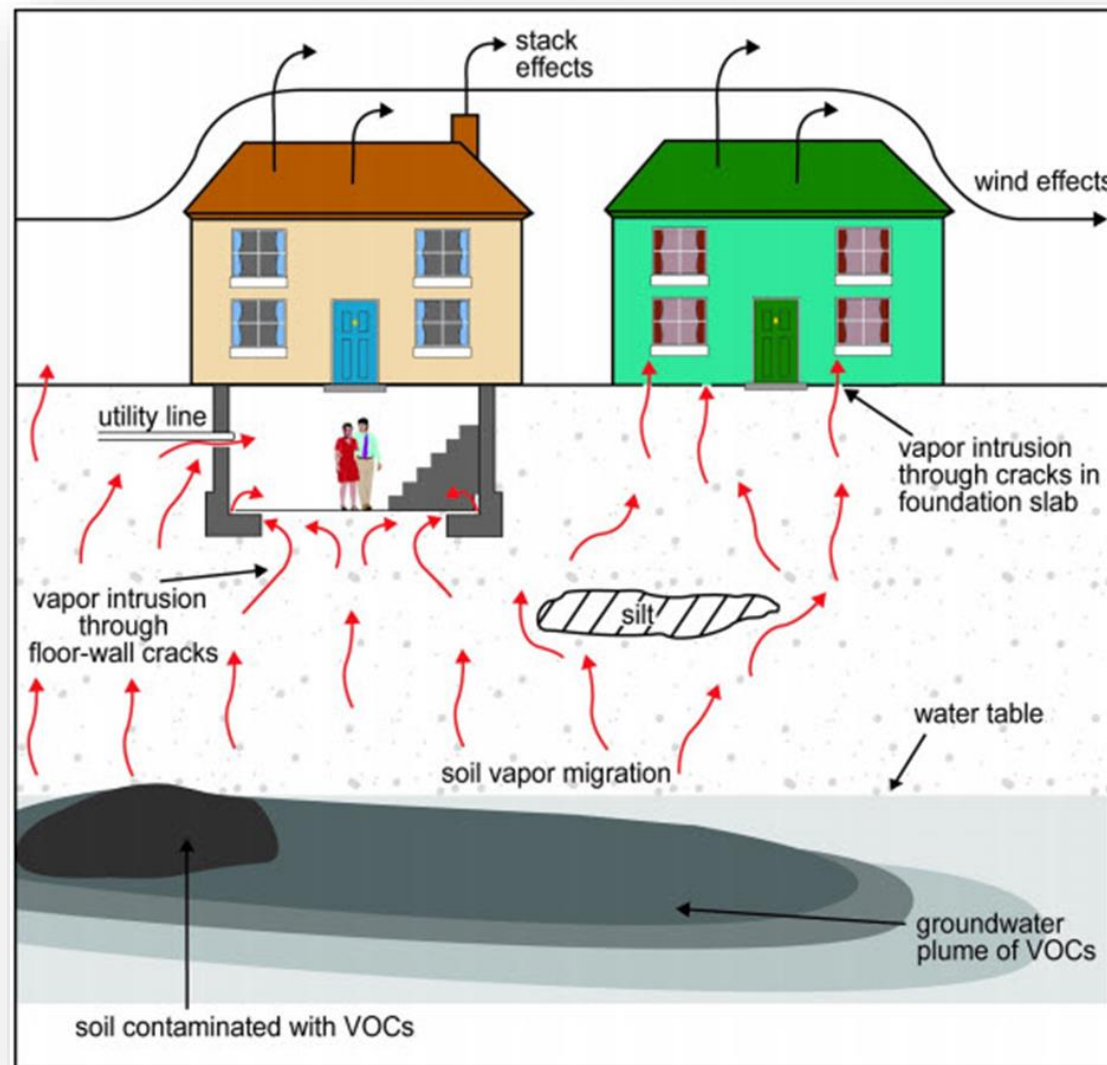


Photo Source: EPA

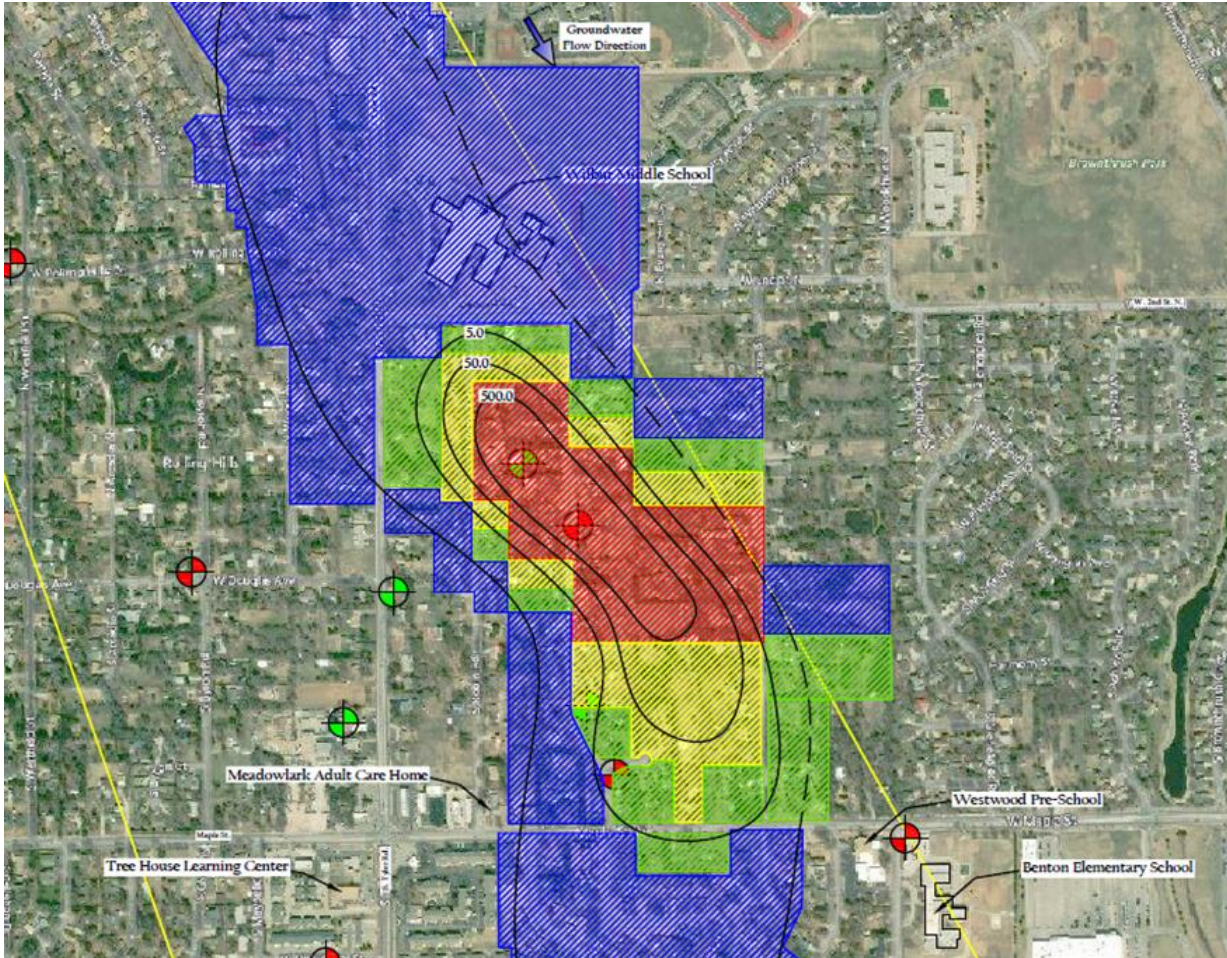
Previous Vapor Intrusion Screening



- Sampling in 2014 & 2015
 - Wilbur Middle School
 - Apartment Complex
 - 9 single-family residences
- All final Indoor Air results were below applicable KDHE action levels
 - PCE VI RSK = $41.7 \mu\text{g}/\text{m}^3$
 - TCE VI RSK = $2.09 \mu\text{g}/\text{m}^3$

Photo Source: KDHE

2018 Vapor Intrusion Screening – in progress



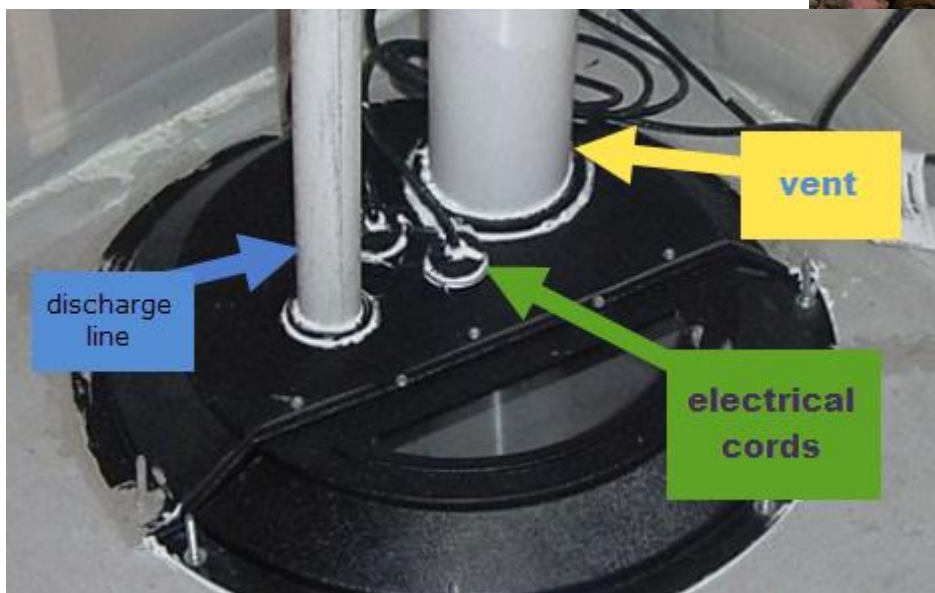
- Select 20 single-family residences
- Obtain access agreements
- Building Survey
- Passive samplers
- Summa canister confirmation
- Sub-slab possible
- Review results w/ owners
- Mitigation as necessary

Indoor Air sampling devices



Photo Source: Sigma-Aldrich, I.T.R.C., Vapor Pin

Vapor Mitigation



Remedial Action Objectives

1. Protective of
Human Health



2. Effective
Reduction of
Contaminant
Mass at Source



3. Technically
and
economically
practicable



Community understanding & agreement with the preferred remedial alternative

The diagram illustrates a groundwater remediation system using Soil Vapor Extraction (SVE) and Soil Air Sparging (SOA). Key components and processes shown include:

- Compressor (Air Sparging):** Located on the left, it pumps air into the ground through a vertical well.
- Blower (SVE):** Located in the center, it extracts vapors from the ground through another vertical well.
- Vapor Treatment:** A unit that treats the extracted vapors before they are released.
- Atmospheric Discharge:** The treated vapors are released into the atmosphere through a stack.
- Source:** The area where the contaminant is initially located, shown as a shaded region in the upper part of the ground.
- Air Flow:** Arrows indicate the movement of air from the compressor, through the ground, and into the blower.
- Contaminant Phases:** The diagram shows three phases of contaminants:
 - Vapor Phase:** Represented by a light gray area near the surface.
 - Adsorbed Phase:** Represented by a medium gray area, indicating contaminants attached to soil particles.
 - Dissolved Phase:** Represented by a hatched area, indicating contaminants dissolved in the groundwater.

The system works by creating a vacuum that draws vapors from the soil into the blower, while air sparging helps to break up and move contaminants towards the extraction point.

Protect and improve the health and environment of all Kansans

Air Sparge / Soil Vapor Extraction - Equipment



Photo Source: KDHE

Air Sparge / Soil Vapor Extraction – horizontal connections

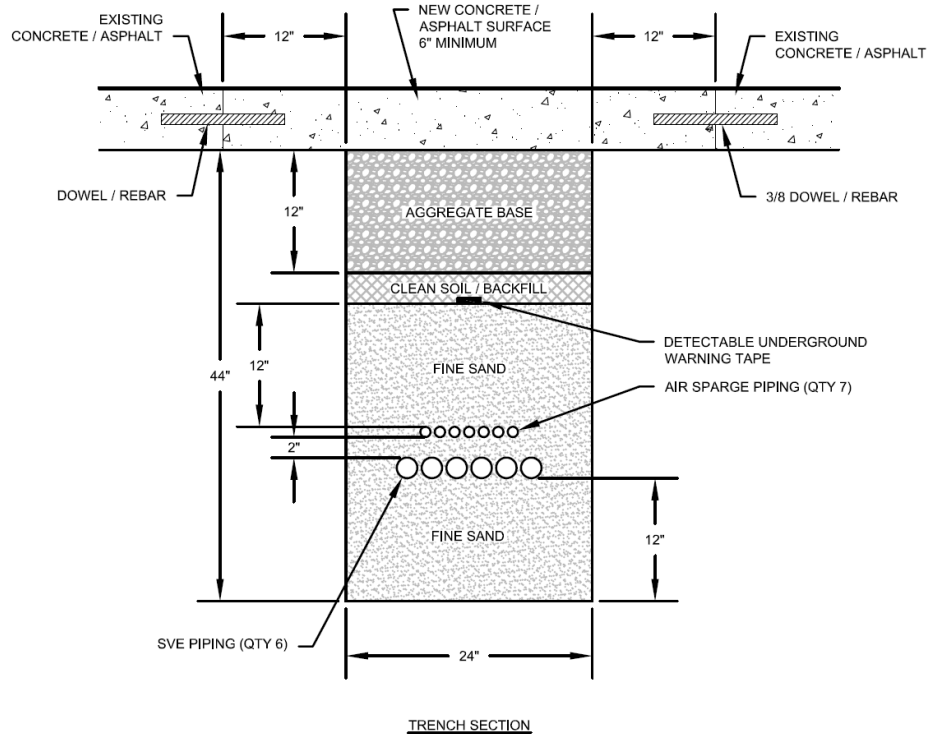


Photo Source: KDHE

Plan View Labels:

- Cutoff Trench (36" Width, Depth Varies)
- 6'x12" Pad (Heavy Traffic)
- 4'x6" Pad (Low/No Traffic)
- 6" SVE/Recovery Well
- 25' c/c
- 12.5'
- 25'
- 25' c/c
- 150' Max
- 3'x12" Pad (Heavy Traffic)
- 2'x6" Pad (Low/No Traffic)
- 2" Sparge Well
- 1' Concrete Offset (If Paved Area)
- Remedial Line Trench (36" Wide x 4'-6" Deep)
- Remedial Line Stubs See Detail on Drawing 4
- Remedial Line Trench Cross Section on Drawing 4

Cross Section Labels:

- Cement Grout (KDHE Article 30, 28-30-2(k)(2))
- Compacted Native Soil
- Fill Sand KDOT PB2, PB3, or Approved Equivalent
- 3" PVC SVE Lines and 1" PVC AS Lines
- 1-1/4" PVC Water Lines and 2" Rigid Conduit (with Sweep Elbow)
- Coarse Backfill KDOT AB-1 or Approved Equivalent

Legend

Protect and improve the health and environment of all Kansans

Interceptor Trench limitations... utilities!



Photo Source: KDHE

Large Diameter Borings

- Increased Surface Area
- Less Intrusive
- Easily located between utilities



Photo Source: Geosearch, Inc.



Remedial Action Timeline



Goal: Winter 2018 Installation

Farah S. Ahmed, MPH, PhD
Environmental Health Officer and State Epidemiologist

Previous KDHE Health Study: Where to find it

- ▶ Report was published in October 2015
- ▶ Is available at:
<https://keap.kdhe.state.ks.us/Ephtm/EphtContent/documents/West%20Wichita%20Investigation%202015.pdf>

Previous KDHE Health Study: What we did

- ▶ Looked into how PCE and TCE enter the body and what the potential health effects were
- ▶ Created a list of the addresses in the area of concern (about 600) and title owners
- ▶ Looked in the Kansas Cancer Registry and the Kansas Birth Defects Information System for the addresses and title owners
- ▶ Drew conclusions based on the information

Previous KDHE Health Study: What we found

- ▶ Did not find any increases in rates of target cancers in the area of concern
- ▶ Did not find an unusual number or types of birth defects

Previous KDHE Health Study: Limitations to address

- ▶ When looking in the cancer registry, we have information on address at the time of diagnosis. No information on how long a person lived in the area.
 - For cancer, there is typically a long period of time between when a person is exposed to a cancer causing agent and when they develop cancer.
- ▶ Looked at title owners. Assumes title owners actually lived in the area.
- ▶ No information on other risk factors like diet, family history, general health status, smoking status, exposure to other contaminants, etc.

Previous KDHE Health Study: Limitations to address

- ▶ The birth defects system has information from the birth certificate and may not reflect where mom lived during the first few weeks of pregnancy.

Why do a Phase 2 Health Study?

- ▶ To learn more about health effects associated with relatively low-level exposures over a very long period of time
- ▶ Would like community agreement and understanding of the plan for further study

- ▶ Study participants: People living in area between 1965 and 2014
 - Will not include a comparison population of unexposed people

- ▶ Data collection: Self-administered questionnaire
 - Will include detailed residential history, occupational history, information on risk factors including diet and smoking, etc.

 - Will include health outcomes of interest from focus groups

- ▶ Survey administration
 - 1 wave of paper surveys with the option of filling it out online
 - Postcard reminders to non-responders with link to online version
 - Additional paper surveys only be request
 - No phone interviews

- ▶ Exposure assessment: Based on responses to the survey.
 - Will not include groundwater modelling

- ▶ Response rates may be low
 - If the response rate is very low, it is hard to draw conclusions about the group as a whole.
 - No comparison group to assess whether rates of diseases are higher or lower

- ▶ Community may need to proactively encourage their neighbors to participate

Thank you/Questions?

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Environmental Health Officer and State Epidemiologist
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Next Steps-



Community
Input



Complete
Vapor Intrusion
Assessment



Finalize
Remedial Design



Installation,
Operation &
Monitoring



Public Comment

Remedial Design Plan Draft on website

<http://www.kdheks.gov/dryclean/index.html>

Comments can be sent to:
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Jesse.Branham@ks.gov
(785) 291-3089

Comments / Questions



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